The FY 2000 Program Announcement on Climate Variability and Predictability

Program Objectives

The ultimate goal of NOAA's Climate Variability and Predictability (CLIVAR) Program is to develop skillful prediction of global climate variability on seasonal-to-interdecadal time scales. The program is designed to understand global climate variability; to determine the spatial and temporal extent to which this variability is predictable; to develop the observational, theoretical and computational means to predict this variability; and to make enhanced predictions. While CLIVAR will ultimately provide the modeling framework to investigate the influence of varying boundary conditions (including sea-surface temperature, soil moisture, sea ice and snow), the near-term emphasis of the NOAA program will be on understanding the coupled ocean-atmosphere system that gives rise to seasonal-to-interdecadal climate variability.

Structure of the NOAA Program

NOAA's contribution to the US CLIVAR program is intended to address known large-scale recurrent patterns (or modes) of variability that influence climate on the regional scale, particularly over the US. Among these patterns are the El-Niño-Southern Oscillation (ENSO), Tropical Atlantic Variability (TAV), the North Atlantic Oscillation (NAO), and the American monsoon systems. While recognizing that the patterns of variability may have global teleconnections, these patterns are manifested generally within a particular geographic region. In order to target limited resources, NOAA has adopted a program structure focused on three geographic regions: the Atlantic, the Pacific, and Pan America.

Funding Availability

NOAA CLIVAR will have an estimated $4 to $6 million available for projects in the priority areas listed below. An estimated range of funding for each regional foci is provided. The actual program funding level will be determined based on the FY 2000 appropriation for the NOAA Climate and Global Change Program.

Research Priorities

CLIVAR Atlantic ($2 to $4 million available)

CLIVAR Atlantic seeks to understand and predict seasonal to decadal climate variability in the Atlantic sector, with an initial focus on variability in the tropical Atlantic climate system. While possessing the potential for a high degree of predictability, the tropical Atlantic presents a challenge to climate scientists in that no single mode of variability (e.g., NAO/AO, ENSO) is dominant in this region. In FY 2000 proposals are invited to address natural climate variability and predictability in the Atlantic coupled ocean-atmosphere-land system, with an emphasis on the tropical Atlantic and its interaction

with other modes of climate variability. Of particular interest are studies which elucidate the mechanisms responsible for seasonal-to-decadal variability of the tropical Atlantic climate system. These studies may seek to: 1) enhance our descriptive knowledge of the phenomena using historical and paleo-climatic records, 2) develop and test hypotheses regarding the mechanisms of variability using simplified or comprehensive models or 3) assess the predictability of tropical Atlantic climate variability. Data set development activities to improve the quality and accessibility of historical climate data sets needed to diagnose the main modes of climate variability in the Atlantic sector are also encouraged.

Ocean and atmospheric observational projects are sought that will build upon sustained and pilot observing networks to: (1) monitor the key processes thought to be most important in giving rise to Tropical Atlantic Variability and its interaction with large scale patterns of climate variability--e.g., NAO/AO, ENSO; (2) provide a core network of ongoing observations that will be useful as a larger-scale context for conducting relevant process studies and assessments; and (3) interact with modeling studies by providing relevant data for model assimilation and verification. Of particular interest are in situ observing system and data set enhancements for improved SST and SSS measurements, direct measurements of surface fluxes, sea level pressure measurements for improved sea surface height fields provided by altimetry, sea level data sets for increased temporal and spacial resolution from tide gauge records, upper ocean temperature and salinity measurements, and atmospheric measurements. Proposals for observational projects must indicate the explicit scientific questions that will be addressed by the proposed system enhancements and describe how the observations will be used in diagnostic, data assimilation, and/or forecast studies to advance our understanding and forecast skill, and/or be used in assessments.

Whenever practical, observing system projects should seek to gain efficiencies by utilizing common platforms/sites/data infrastructure for multiple objectives including the objectives of CLIVAR research, of the operational forecast centers, of other climate research programs (e.g., Global Carbon Cycle), and for the detection and attribution of climate change. For observing system projects, factors considered will include proposed methods of real time data delivery, delivery of metadata and quality controlled products to global data sets, international coordination, and adherence to the Ten Principles of Climate Monitoring (Adequacy of Climate Observing Systems, NRC, 1999, ISBN 0-309-06390-6).

Projects proposing to contribute profiling floats and/or data management infrastructure to the Array for Real-time Geostrophic Oceanography (ARGO) should apply to the National Oceanographic Partnership Program (NOPP) instead of this CLIVAR announcement.

For further information on modeling and analysis foci contact James Todd at the address below, 301-427-2089 ext. 139, james.todd@noaa.gov. For information on observational efforts contact Michael Johnson, 301-427-2089 ext. 169, johnson@ogp.noaa.gov.

CLIVAR Pacific ($1 million available)

Previously known as GOALS, the CLIVAR Pacific program will continue to pursue improvements in predictive ENSO modeling through diagnostic, empirical and modeling studies. Development of new observing systems and models is not pursued at this time. The challenge to improve predictions of ENSO and its teleconnections will require a continued investment in research to understand the mechanisms which give rise to and maintain ENSO, how and the degree to which ENSO influences climate variability in specific regions around the globe, and how to best exploit and present predictive information so that it will be of optimal use in resource planning.

Key areas of investigation include the sensitivity of ENSO prediction to initial values, the seasonality of predictability and its origins, the role of non-linearity in limiting predictability, the influence of intraseasonal variability, and the nature of the annual cycle and its interaction with interannual variability. NOAA will also continue to exploit existing data sets in order to improve the understanding of ENSO processes, improve estimates of heat, momentum, mass and moisture budgets, and test and improve model parameterizations of key processes that are essential in the coupling of the ocean and atmosphere. Experimental predictive modeling using a hierarchy of coupled modeling approaches will continue to be pursued, with attention to improvements in initialization and assimilation techniques.

ENSO teleconnections throughout the tropics and into the extratropics will continue to be explored. NOAA has a particular interest in understanding and modeling the response over North America. Specifically, efforts are invited to determine the limits in predictability of the atmosphere induced by tropical Pacific sea surface temperature changes, to diagnose and model the global response to warm, cold and neutral states of the ENSO cycle, and to examine the changes in probabilities of extreme events induced by ENSO.

Key to improved ENSO prediction is an improved understanding of the non-stationarity of ENSO and its predictability over interdecadal timescales. NOAA invites modeling and diagnostic studies to explore hypotheses on mechanisms that give rise to interdecadal variability of ENSO. Synthesis of results is a priority, particularly assessment of the relative role of different mechanisms and the understanding of inderdecadal variation of ENSO predictability.

For further information on the CLIVAR Pacific program contact Michael Patterson at the address below, 301-427-2089 ext. 102, Michael.Patterson@noaa.gov.

CLIVAR Pan American Climate Studies (PACS) ($1 million available)

The principal goal of PACS is to extend the scope and improve the skill of operational seasonal-to-interdecadal climate prediction over the Americas. Particular emphasis is placed on understanding the mechanisms associated with warm season rainfall and its potential predictability. In addition to seasonal mean rainfall and temperature, PACS is concerned with the frequency of occurrence of significant weather events over the course of a season or seasons.

The rainfall climatology of tropical Pan America is dominated by the intertropical convergence zones over the eastern Pacific and equatorial Atlantic, the continental monsoons over the land regions, and the interplay among them. Regional rainfall anomalies over the Americas are hypothesized to be largely a reflection of the intensification or weakening, or subtle shifts in positions of these features that organize the rainfall. In order to understand and forecast the year to-year variations in summertime climate, it is important for models to effectively resolve the annual cycle of these important features.

The mean annual climate over the domain is characterized by strong equatorial asymmetries that cannot be explained by sun-earth geometry. The asymmetry appears to be a manifestation of land sea geometry and coupled ocean-atmosphere-land interactions involving surface winds, ocean currents, upwelling, deep convection, and stratus cloud decks. Understanding and modeling the annual cycle of these features and their coupling is required for improving seasonal-to-interannual climate predictions for the Americas.

For FY 2000, empirical, diagnostic, and modeling studies are encouraged to study 1) cause-and effect relationships for monsoon modulation on time scales from seasonal to interdecadal, including teleconnection patterns that span the Pan American region; 2) the structure and evolution of the eastern tropical Pacific SST field, the ITCZ/cold tongue complex and subtropical stratus cloud decks and their influence on climate over the Americas; and 3) dynamical processes responsible for the onset, demise and character of the continental-scale monsoon over South America.

A joint CLIVAR/GEWEX Warm Season Precipitation Initiative announcement of opportunity, issued simultaneously with this announcement, invites new data analysis and modeling investigations into the annual cycle and interannual variability of summer rainfall in the North American monsoon system, emphasizing links between that variability and the boundary conditions in the adjacent oceans and underlying land surfaces. PIs interested in such studies should apply to that announcement

For further information on PACS contact Michael Patterson at the address below, 301-427-2089 ext. 102, Internet: Michael.Patterson@noaa.gov or Andrea Ray, 303-497-6434, ajr@cdc.noaa.gov.

Schedule and Proposal Submission

The following deadlines for submission to this Announcement should be strictly followed.

Letters of intent must be received at OGP no later than **Friday, October 15, 1999**.

Full proposals must be received at OGP no later than **Friday, January 7, 2000**.

Applicants who have not received a response to their letter of intent by Monday, November 8, 1999, should contact Linda Prevas at, 301-427-2089 ext. 104, prevas@ogp.noaa.gov. We anticipate that review of full proposals will occur during Spring, 2000, and funding should begin during Summer, 2000, for most approved projects. July 1, 2000, should be used as the proposed start date on proposals unless otherwise directed by a program manager. Applicants should be notified of their status within 6 months of application. All proposals must be submitted in accordance with the guidelines below. Failure to heed these guidelines may result in proposals being returned without review.

Proposals should be submitted to:

Office of Global Programs
National Oceanic and Atmospheric Administration
100 Wayne Avenue, Suite 1210
Silver Spring, MD 20910-5603
Attn.: Linda Prevas

Eligibility

Extramural eligibility is not limited and is encouraged with the objective of developing a strong partnership with the academic community. Universities, non-profit organizations, for profit organizations, State and local governments, and Indian Tribes, are included among entities eligible for funding under this announcement. The NOAA Climate and Global Change Program has been approved for multi-year funding up to a three year duration. Funding for non-U.S. institutions is not available under this announcement.

Letters of Intent

Letters of Intent (LOI): Letters should be no more than two pages in length and include a working title for the project, the name and institution of principal investigator(s), a statement of the problem, brief summary of work to be completed, and approximate cost of the project. Email submission of LOIs is preferred. Evaluation of the proposed project's relevance to FY 2000 CLIVAR priorities will be made by program management. It is in the best interest of applicants and their institutions to submit letters of intent; however, it is not a requirement. Projects deemed unsuitable during LOI review will not be encouraged to submit full proposals.

Evaluation Criteria

Consideration for financial assistance will be given to those proposals that meet the following evaluation criteria:

(1) **Scientific Merit**: Intrinsic scientific value of the subject and the study proposed, including methodology and readiness.

(2) **Relevance**: Importance and relevance to the goals of the selected Program Element(s).

Selection Procedures

All proposals will be evaluated and ranked using the criteria above by (1) independent peer mail review, and/or (2) independent peer panel review. Both NOAA and non-NOAA experts in the field may be used in this process. The program managers do not participate in the scoring of proposals by the independent peer panel. The panel recommendations and evaluations will be considered by the program manager in final selections. Those ranked by the panel and program as not recommended for funding will not be given further consideration and will be notified of non selection. For the proposals rated either Excellent, Very Good or Good, the Program Manager will: (a) ascertain which proposals meet the program priorities, and do not substantially duplicate other projects that are currently funded by NOAA or are approved for funding by other federal agencies, hence, awards may not necessarily be made to the highest-scored proposals, (b) select the proposals to be funded, (c) determine the total duration of funding for each proposal, and (d) determine the amount of funds available for each proposal.

Unsatisfactory performance by a recipient under prior Federal awards may result in an application not being considered for funding.

Proposal Submission

The guidelines for proposal preparation provided below are mandatory. Failure to heed these guidelines may result in proposals being returned without review.

Required Elements: All proposals should include the following elements:

(1) **Signed title page**: The title page should be signed by the Principal Investigator (PI) and the institutional representative and should clearly indicate which project area is being addressed. The PI and institutional representative should be identified by full name, title, organization, mailing address, telephone number, fax number, and email address. The total amount of Federal funds being requested should be listed for each budget period.

(2) **Abstract**: An abstract must be included and should contain an introduction of the problem, rationale and a brief summary of work to be completed. The abstract should appear on a separate page, headed with the proposal title, institution(s) investigator(s), total proposed cost and budget period.

(3) **Results from prior research**: The results of related projects supported by NOAA and other agencies should be described, including their relation to the currently proposed work. Reference to each prior research award should include the title, agency, award number, PIs, period of award and total award. The section should be a brief summary and should not exceed two pages total.

(4) **Statement of work**: The proposed project must be completely described, including identification of the problem, scientific objectives, proposed methodology, and relevance to the CLIVAR priorities listed above, including how this work applies/contributes to understanding predictability or improving predictions, or to applications. Benefits of the proposed project to the general public and the scientific community should be addressed. Also, if appropriate, the proposal should indicate how the proposed work relates to any NOAA climate assessment or those funded by other agencies. A year-by-year summary of proposed work must be included clearly indicating that each year's proposed work is severable and can easily be separated into annual increments of meaningful work. The statement of work, including references but excluding figures and other visual materials, must not exceed 15 pages of text. Investigators wishing to submit group proposals that exceed the 15 page limit should discuss this possibility with the appropriate Program Manager prior to submission. In general, proposals from 3 or more investigators may include a statement of work containing up to 15 pages of overall project description plus up to 5 additional pages for individual project descriptions.

(5) **Budget**: The proposal must include total and annual budgets corresponding with the descriptions provided in the statement of work. Additional text to justify expenses should be included as necessary. Federally required forms for budget information are described in the other requirements section below.

(6) **Vitae**: Abbreviated curriculum vitae are sought with each proposal. Reference lists should be limited to all publications in the last three years with up to five other relevant papers.

(7) **Current and pending support**: For each investigator, submit a list that includes project title, supporting agency with grant number, investigator months per annum, total project funding, duration, and status (either current or pending). Requested values should be listed for pending support.

Proposals submitted to the NOAA Climate and Global Change Program must include the original and two unbound copies of the proposal. Investigators are not required to submit more than 3 copies of the proposal, however, the normal review process requires 20 copies. Investigators are encouraged to submit sufficient proposal copies for the full review process, particularly if they wish all reviewers to receive color, unusually sized (not 8.5x11'), or otherwise unusual materials submitted as part of the proposal. Proposals must be limited to 30 pages (numbered), including budget, investigators vitae, and all appendices, and should be limited to funding requests for one to three year duration. Appended information may not be used to circumvent the page length limit. Federally mandated forms are not included within the page count. Proposals should be sent to the NOAA Office of Global Programs at the above address. Facsimile transmissions and electronic mail submission of full proposals will not be accepted. Applicants may obtain a standard NOAA application kit from the NOAA Office of Global Programs.

Federal Form Requirements:

The following federal forms are required by non-Federal applications. Applicants employed by the Federal Government need not submit these forms.

Only three copies of the set of forms are necessary. For ease in processing, it is preferable for each set of forms to be separate from the copies of the proposal. The forms do not count in the total page number limit for the proposal.

(1) **Application** - Applicants must submit a Standard Form 424 (4-92) Application for Federal Assistance, including a detailed budget using the Standard Form 424a (4 - 92), Budget Information -- Non-Construction Programs. The form is included in the standard NOAA application kit.

(2) **Primary Applicant Certification** - All primary applicants must submit a completed Form CD 511, "Certification Regarding Debarment, Suspension and Other Responsibility Matters; Drug Free Workplace Requirements and Lobbying". Applicants are also hereby notified of the following:

(a) **Nonprocurement Debarment and Suspension** - Prospective participants (as defined at 15 CFR Part 26, section 105) are subject to 15 CFR Part 26, Nonprocurement Debarment and Suspension and the related section of the certification form prescribed above applies;

(b) **Drug Free Workplace** - Grantees (as defined at 15 CFR part 26, section 605) are subject to 15 CFR Part 26, Subpart F, Government-wide Requirements for Drug-Free Workplace (Grants)î and the related section of the certification form prescribed above applies;

(c) **Anti-Lobbying** - Persons (as defined at 15 CFR Part 28, section 105) are subject to the lobbying provisions of 31 U.S.C. 1352, Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions, and the lobbying section of the certification form prescribed above applies to applications/bids for grants, cooperative agreements, and contracts for more than $100,000, and loans and loan guarantees for more than $150,000, or the single family maximum mortgage limit for affected programs, whichever is greater; and

(d) Anti-Lobbying Disclosures - Any applicant that has paid or will pay for lobbying using any funds must submit an SF-LLL, Disclosure of Lobbying Activities as required under 15CFR part 28, appendix B.

(3) Lower Tier Certifications - Recipients must require applicants/bidders for subgrants, contracts, subcontracts, or lower tier covered transactions at any tier under the award to submit, if applicable, a completed Form CD-512,

Certifications Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions and Lobbying and disclosure form SF LLL, Disclosure of Lobbying Activities Form CD-512 is intended for the use of recipients and should not be transmitted to DOC. SF-LLL submitted by any tier recipient or subrecipient should be submitted to DOC in accordance with the instructions contained in the award document.

Other Considerations

Recipients and subrecipients are subject to all applicable Federal laws and Federal and Department of Commerce policies, regulations, and procedures applicable to Federal financial assistance awards.

Pre-award Activities - If applicants incur any costs prior to an award being made, they do so solely at their own risk of not being reimbursed by the Government. Notwithstanding any verbal assurance that may have been received, there is no obligation to the applicant on the part of Department of Commerce to cover pre-award costs.

This program is subject to the requirements of OMB Circular No. A-110, "Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations", and 15 CFR Part 24, "Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments", as applicable. Applications under this program are not subject to Executive Order 12372, Intergovernmental Review of Federal Programs.

All non-profit and for-profit applicants are subject to a name check review process. Name checks are intended to reveal if any key individuals associated with the applicant have been convicted of, or are presently facing criminal charges such as fraud, theft, perjury, or other matters which significantly reflect on the applicant's management, honesty, or financial integrity.

A false statement on an application is grounds for denial or termination of funds and grounds for possible punishment by a fine or imprisonment as provided in 18 U.S.C. 1001.

No award of Federal funds shall be made to an applicant who has an outstanding delinquent Federal debt until either:

(1) the delinquent account is paid in full,

(2) a negotiated repayment schedule is established and at least one payment is received, or

(3) other arrangements satisfactory to the Department of Commerce are made.

Buy American-Made Equipment or Products - Applicants are encouraged that any equipment or products authorized to be purchased with funding provided under this program must be American made to the maximum extent feasible.

The total dollar amount of the indirect costs proposed in an application under this program must not exceed the indirect cost rate negotiated and approved by a cognizant Federal agency prior to the proposed effective date of the award or 100 percent of the total proposed direct cost dollar amount in the application, whichever is less.

If an application is selected for funding, the Department of Commerce has no obligation to provide any additional future funding in connection with the award. Renewal of an award to increase funding or extend the period of performance is at the total discretion of the Department of Commerce.

In accordance with Federal statutes and regulations, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, denied benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from the NOAA Climate and Global Change Program. The NOAA Climate and Global Change Program does not have direct TDD (Telephonic Device for the Deaf) capabilities, but can be reached through the State of Maryland supplied TDD contact number, 800-735-2258, between the hours of 8:00 am and 4:30 pm.